CULTURAL INFLUENCES ON THE USE AND PERCEPTION OF INTERNET-BASED NSS - AN EXPLORATORY ANALYSIS *

Sabine Köszegi[1], Rudolf Vetschera[2], and Gregory Kersten [3]

[1,2] Department of Business Studies, University of Vienna, Bruenner Strasse 72,
A-1210 Vienna, Austria. Tel: +43-1-4277-38171, Fax: +43-1-4277-38174,
email: Sabine.Koeszegi@univie.ac.at, Rudolf.Vetschera@univie.ac.at

[3]Decision Sciences and MIS, Concordia University, 1455 de Maisonneuve Blvd. West,
Montreal, Canada. Tel: +1-613-526-5571, Fax: 1-514-848-2824,
email: gregory@mercato.concordia.ca

Bibliographical notes:

Sabine T. Köszegi is an Assistant Professor at the School of Business, Economics, and Computer Science of the University of Vienna. Her interests concern organizational networks, virtual organizations and teams, and Web-based negotiations. She received her Ph.D. degree from the University of Vienna for her research on the trust building process in a virtual context.

Rudolf Vetschera is a professor of organization and planning at the Department of Business Studies, University of Vienna, Austria. Before that position, he was professor of Business Administration at the University of Konstanz, Germany. He has published three books and about forty reviewed articles. His main research area is in the intersection of organization, decision theory and information systems, especially in network organizations. He holds a PhD from the University of Vienna, Austria.

Gregory Kersten is a professor of decision and information systems in the Department of Decision Sciences and MIS, and the Director of the Information Systems in the John Molson School of Business, Concordia University. He is the Principal Investigator of the InterNeg Project and a member of the Ottawa-Carleton Institute for Computer Science. He authored and co-authored three books and over hundred refereed publications.

Abstract

The web-based negotiation support system Inspire has been used by over 2000 participants worldwide in experimental negotiations. From the survey conducted among the users we find that they have very positive attitudes towards the Inspire system and Internet-based negotiation support in general. Nevertheless, we also observed differences in the evaluation and use of the system depending on the users' country of residence and other user characteristics. This paper presents an exploratory analysis of the data collected during negotiations. An extension of the Technology Acceptance Model is used to identify factors that influence user's perception of Internet-based negotiation support systems.

Keywords

electronic negotiation, negotiation support, system evaluation, user assessment, international negotiation, cultural differences, business negotiations, World Wide Web, decision support.

* Acknowledgments. The authors gratefully acknowledge the contribution of each member of the InterNeg team and, in particular, wish to thank Kumudini Ponnudurai and Gordon Lo for their enthusiastic help. The project has been partially supported with grants from the Natural Sciences and Engineering Research Council, Canada and Concordia University.

1 Introduction

Internet-based negotiations are becoming an important mode of business communication. Recently, several web sites have been constructed to provide business organizations with an "electronic negotiation table" (for example, http://www.ozro.com, http://www.biosgroup.com, http://moa.com and http://www.frictionless-commerce.com). The present focus in these web sites is on providing a virtual space to seek for potential partners, exchange information between parties, keeping negotiation records and providing on-line documentation.

Since internet-based business negotiations are a relatively new development, many issues involved in the design and use of such systems are still unresolved. System design and development cannot be driven only by technology. In order to get wide acceptance for such systems, user attitudes towards various design features also have to be taken into account. However, there are only few studies which attempt to analyze user attitudes towards Web-based NSS.

Empirical research on the acceptance of such systems in general, and particularly of novel features not available in face-to-face negotiations, is important for system designers. Lack of such insight might lead developers to forego the potential of innovative solutions and to provide only familiar capabilities in order to make the environment as friendly as possible to users.

User attitudes towards a Web-based NSS are a rather complex issue because of the potential geographical, and thus cultural, diversity of potential users of such systems. Web-based negotiation systems explicitly aim at providing a communication platform and marketplace in which parties from all over the world can freely participate. In this context, it is quite possible that features, which make a system particularly attractive to users from one culture cause users from another culture to reject the same system.

In this paper, we study the impact of culture on the use and on users' perceptions and assessment of a Web-based NSS. We use data collected during negotiations with the Inspire negotiation support system since 1996. Inspire is an experimental negotiation support system and it is available on the Internet (http://interneg.org/inspire). It combines elements of traditional negotiations (i.e., exchange of messages and offers between parties) with analytical and visual support tools. During the sample period,

over two thousands negotiations have been carried out using Inspire, involving students, managers and engineers from a wide range of countries. This offers a unique opportunity to study the acceptance of internet-based negotiation tools in widely dispersed cultural environments.

The data collected so far indicates a surprisingly high level of overall satisfaction and willingness to use Internet-based negotiation support in the future. Nevertheless, considerable differences in the acceptance and use of Inspire do exist. In this paper we present an exploratory analysis of the role of user characteristics, especially user culture that may explain the observed differences.

Culture is an extensively researched variable in international negotiations and its impact on negotiation process and outcome is well accepted (e.g. Adler, 1993a; Adler & Graham, 1989; Brett et al., 1998a; 1998b; Chan, 1998; Graham & Mintu-Wimsat, 1997; Kharbanda & Stallworthy, 1991). Although Negotiation Support Systems (NSS) as well as other support systems like Group Decision Support Systems (GDSS) are implemented in an international context, cultural impacts on system use are to a large extent neglected in this field of research (Tan, Watson, & Wei, 1995). To understand better how NSS can successfully support negotiations across cultures, research needs to integrate culture as an independent factor in the assessment of support tools.

Such an extension was proposed in a modified version of the technology acceptance model (TAM) developed for Web-based Negotiation Support Systems (Vetschera, Kersten, & Köszegi, 2001). This suggested model explicitly considers culture among other user characteristics as an important variable to explain user attitudes.

In Section 2 we give a brief overview of the Inspire system, its history and the way negotiations are supported in that system. Section 3 introduces the modified TAM model used in this study. In Section 4, the user population and the empirical results are presented and in Section 5 we discuss topics for ongoing and future research.

2 Inspire negotiations

2.1 Negotiation topic and process

The Inspire system, developed as a part of the InterNeg project (http://interneg.org), is arguable the first Web-based negotiation support system developed to facilitate and support bilateral negotiations. The system provides negotiators with one standardized case of business negotiations in order to allow for statistically valid analysis. It was designed to evoke a negotiation situation with which users from

almost any country are familiar and therefore extended contextual explanation is not necessary. As the predominantly international users' proficiency in English is not easily predictable, the description of the case is fairly simple and it fits within one and a half pages.

In the negotiation, the users represent two companies: Itex Manufacturing, a producer of bicycle parts, and Cypress Cycles that builds bicycles. Both sides negotiate over four issues: the price of the bicycle components, delivery schedules, payment arrangements, and terms for the return of defective parts. Negotiators are only informed about their (and their opponent's) role in the Cypress-Itex case and they make their own decisions about their preferences, strategy and tactics.

The negotiation is conducted anonymously. Although users are not prevented from revealing their identity or other personal information, they cannot verify the information about their counterparts. This is because negotiations involve participants from different geographic locations. During the negotiation, the parties are in contact only with each other, the experimenters have no contact with the negotiators (i.e., Inspire users). Negotiations are conducted over three weeks with an imposed deadline. Upon request from both negotiators the deadline may be extended. At any point in time the user may terminate the negotiation and request a new one.

Most of the Inspire users (app. 85%) use the system as a part of their course assignment. The courses range from information systems, decision support systems, negotiations, law, international business, electronic commerce, to English as a second language, and tourism and hospitality. Several examples of students' assignments are available at: http://interneg.carleton.ca/interneg/training/inspire/reports/

Course instructors request Inspire negotiations for groups of students by filling in a short electronic form on the InterNeg site (http://interneg.org/interneg/training/inspire/instructors_synopsis.html). A url address is then generated which instructors give to their students. Each student from this group uses this address and a registration form is generated so that the student can register himself/herself. She/he provides an email address and selects his/her own user name.

Inspire negotiation are set up once a month for groups of students from several universities; there are typically between 150 and 250 students from 3-5 universities who negotiate at the same time. Students log-in to the system by providing the negotiation name which is selected by the instructor, and the user name which they select. Their opponents know their counterparts by the user name but they do not know their negotiation name. This protocol has been used so that neither an instructor nor a counterpart can obtain access to a student's negotiation records without his/her consent.

Inspire users do not obtain any incentives from the experimenters (InterNeg team). Those who conduct negotiation as a part of their assignment are motivated with the assignment requirements. However, their choice of strategy and willingness to achieve a compromise cannot be verified by their instructors because: (1) the negotiation results also depend on the other party activities, and (2) instructors do not receive any information from the InterNeg team regarding their students' activities.

There is one exception in the experimenters' lack of control of the on the Inspire negotiations. If one negotiator complains that his/her counter-part does not participate in the negotiation, then such a counterpart receives an email from the InterNeg. She/he is given three days to engage in negotiations. If there the counter-part activity remains inactive, the negotiation is terminated and the negotiator is given an option of entering a new negotiation with another counter-part. In each series of negotiations there are less than 5% of the inactive partners. Another possible influence on the users' activities is the negotiation deadline imposed by the Inspire system and also the instructor's deadline for submitting an assignment which is beyond the control of the experimenters. However, all instructors accept that the negotiation may take at least three weeks.

2.2 Negotiation analysis and support

The Inspire system has its roots in negotiation analysis and such negotiation support systems as Nego (Kersten, 1985) and Negotiation Assistant (Rangaswamy & Shell, 1997). One research goal in its development was to study the use of decision analytic methods in the practice of negotiations. One innovation of the Inspire System is to offer users both a communication platform to conduct negotiations as well as analytical and visual tools to assist users in the negotiation process. Both features of the system are described briefly in the next sections.

The communication platform

Negotiations are facilitated by the communication platform. Negotiators exchange offers consisting of values for all four issues (price, delivery, payment, return of defective parts). For each issue there is a pre-specified set of options, i.e., issue values. Altogether, there are 180 complete and different potential offers (alternatives) in which values of all four issues are specified.

Figure 1 about here

Negotiators are informed about their role and the interests of the company they represent. This allows them to make their own decisions about their strategies and tactics. They are not required to make concessions or achieve a compromise.

Inspire users negotiate through the exchange of offers. They can also attach text messages to offers or exchange messages without offers. This opportunity for rich communication not only makes the negotiation process more realistic but also enhances the 'contexting' of the negotiation situation for both parties. By exchanging information about attitudes and expectations, negotiators can more easily create a positive negotiation atmosphere and develop a personal relationship based on mutual understanding and trust. Written messages also allow exerting pressure on the negotiation partners and provide contextual information (Kersten & Noronha, 1999a).

Analytical negotiation support

The analytical features of Inspire support users in their decision making in each of the three phases of negotiation: pre-negotiation, negotiation, and post-settlement (Kersten & Noronha, 1999b).

In the pre-negotiation phase the system is used to analyze the scenario and evaluate feasible alternatives (possible offers). In this phase each user specifies his/her preferences and the system constructs the user's utility function. The system uses hybrid conjoint measurement for utility construction and discrete optimization (Angur, Lotfi, & Sarkis, 1996; Green & Wind, 1973). Conjoint analysis is simple, does not impose major requirements on the users, and does not require linearity assumptions (Green & Wind, 1973). The ease of use and simple informational requirements are— in our view — necessary features for systems used by people with very different educational, professional and cultural backgrounds.

During the negotiation phase the system provides utility values of decision alternatives considered by the user and of the offers submitted by both parties. The system records the process and provides a negotiation history as well as a graphical visualization of the negotiation's dynamics.

Figure 2 about here

The Inspire system presents a tabularized history of negotiation and graphs to both parties in a symmetric manner. Each party can see only their own offer ratings (utilities) and the colour-coding is uniform: green for the supported user and red for his/her opponent. These representations of the negotiation dynamics provide negotiators with a rich representation of the process without indicating the good or preferred alternatives or strategies.

After the parties agree upon a compromise the system determines whether the achieved compromise is non-dominated (efficient). If the compromise is inefficient the system suggests the post-settlement phase. This phase begins with the computation of efficient alternatives which dominate the achieved compromise. Several alternatives are then selected and displayed. The parties may then continue negotiation until they reach an efficient compromise.

3 Research focus and model

3.1 Research background

As we have already stated, questionnaires provided by the system after conclusion of each negotiation session indicate an overwhelmingly positive attitude of Inspire users towards Web-based negotiation support (for a description of the sample see section 4). The answers to three questions indicating users' willingness to use a system similar to Inspire are given in Table 1.

Table 1 about here

These results per se constitute a convincing argument for the viability and acceptance of Internet-based negotiation support. Our research question refers to the particular factors that lead to the observed level of acceptance of this new technology and particularly to the role culture might play among these factors.

Many studies on intra- and inter-cultural negotiations found a significant influence of culture on the process and outcome of negotiations (some examples are Adler, 1993a; Adler & Graham, 1989; Brett et al., 1998a; 1998b; Chan, 1998; Graham & Mintu-Wimsat, 1997; Kharbanda & Stallworthy, 1991). Most of these studies were conducted in a face-to-face experimental setting and concentrate on the impact of culture on process variables, negotiation strategies, negotiation atmosphere and outcomes. Fur-

thermore, these studies do not differentiate between the influence of participants' culture on negotiation and the influence of the subjects' perceptions of their counterparts, the cultural differences and their expectations resulting from these perceptions.

Electronic negotiations remove visual clues about the opponent's culture, gender and other characteristics. Thus, subjects are no longer able to adapt their behavior towards a specific opponent. They have to ground their strategies and tactics in their own attitudes and biases without intervening of external factors. Web-based negotiations thus offer a unique opportunity to study possible effects of a negotiator's own culture on behavior.

In web-based negotiations, the system itself is another, potentially important factor which is not present in face-to-face negotiations. This factor might also influence the relationship between culture and behavior. The communication features and other support tools of a NSS may be more convenient or helpful for users of one culture than for users of another culture. For example, research by (Hall, 1976) revealed the connection of cultural norms and behavioral and linguistic patterns. By distinguishing between low-context and high-context cultures, Hall describes how much information needs to be coded and explicitly transmitted in a message (i.e. 'contexting') to be efficient in different cultures (p. 91ff). According to Hall, in low-context cultures, like the United States or northern European countries, there is only a small amount of shared and implicit information carried in the context of an event. This creates a high need for contexting during communication. Contrarily, in high-context cultures like in Latin-American countries or in China most of the information is either contained in the physical context or internalized in the parties. Consequently, we would expect to find differences in the use of the communication features of the system for users from different cultural backgrounds. The attitudes towards other features of a NSS might also depend on culture.

To our knowledge, there are only few studies so far which take these specific interaction effects between technical and cultural aspects of support systems into account (Watson et.al 1994, Kersten et.al. 1999, Tan et al., 1995). In the following, we present our approach to analyze electronic negotiations. Due to the novelty of this field we refrain from formulating explicit hypotheses but use an exploratory approach to uncover the importance of cultural aspects for the use and attitude towards specific features of negotiations conducted via Inspire.

3.2 Framework of analysis

Users satisfaction and willingness to use an information system are important concepts in IS evaluation (Benbasat & Nault, 1990; Guimaraes, Igbaria, & Lu, 1992). Both concepts are often used to measure

the 'success' of implementing an information system. One of the most often used models in this field is the technology acceptance model TAM (Davis, 1989). In this model, the intention to use a system is determined by the attitude towards the system which, in turn, depends on two subjective factors: the perceived *usefulness* and the perceived *ease of use*. Perceived usefulness is defined by Davis (1989, p. 320) as "*the degree to which a person believes that using a particular system would enhance his or her job performance*" whereas perceived ease of use refers to "*the degree to which a person believes that using a particular system would be free of effort*". An extensive amount of empirical studies confirm the appropriateness of the distinction between the two concepts and also confirms the basic structure of TAM (Agarwal & Prasad, 1998; Doll, Hendrickson, & Deng, 1998; Mathieson, 1991; Straub, Keil, & Brenner, 1997; Taylor & Todd, 1995).

The analysis we present in this study is based on the AMIS model (Assessment Model of Internet-based Support), a modified version of the TAM model developed for Internet-based NSS (Vetschera et al., 2001). The AMIS model was empirically tested for Inspire users and supported by statistical analysis.

Figure 3 about here

The AMIS model depicted in Figure 3 combines users' experiential attitudes with the results they achieve based on the use of the system. According to AMIS, the intention to use an Internet-based NSS in the future is determined by the holistic assessment of one such system, which is based on concrete experiences. The assessment is directly influenced by three factors. In addition to experienced usefulness and experienced ease of use, which are based on the corresponding factors of the TAM model, AMIS also considers positive results of system use to lead to a better assessment of the system. These relationships were confirmed in a previous study by Vetschera et al. (2001).

The AMIS model further suggests that the evaluation of the system with respect to usefulness and usability depends on the negotiators' extent of use of the system. And - by definition - the actual use of a NSS should positively influence the outcome, i.e. the result of negotiations. However, Vetschera et al. (2001) only found a significant influence of actual use on experienced usefulness.

Several earlier extensions of the TAM model already suggested to integrate various characteristics of users (such as experience or education), of tasks, and of the system as factors influencing perceived ease of use and perceived usefulness (e.g. Al-Khaldi, 1999; Dishaw & Strong, 1991; Jackson, Chow, & Leitch, 1997; Moore & Benbasat, 1991; Szajna, 1996; Taylor & Todd, 1995). The AMIS model also considers these factors, although for our analysis, task and system factors are the same for all users and thus need not be taken into account explicitly.

In this study, we will explore several relationships suggested by the AMIS model. In particular, we will consider effects of user characteristics on experienced ease of use and experienced usefulness to describe the interaction between user characteristics and the Inspire system (indicated in gray in figure 3). Additionally, we will analyze a possible influence of user characteristics on the actual use of the system. This relationship is not suggested in AMIS and, if confirmed, could lead to an extension of the model.

Previous work on the impact of user characteristics on the assessment of support systems provides some evidence on our propositions. A significant positive impact of the level of education and previous experience on perceived ease of use was found by Agarwal (1999). Other authors studied direct relationships between user characteristics and system assessment without considering perceived (or experienced) usefulness or ease of use as intermediate variables. Yaverbaum (1989) reports significant relationships between demographic characteristics of IS users and the "motivating potential score", which is related to users' willingness to use a system. Guimaraes (1992) found a weak influence of decision maker characteristics (e.g. experience) on satisfaction with DSS, with other factors as task characteristics and the implementation process having stronger influence. Udo (1994) also reports positive relationship between user experience and overall satisfaction with a DSS. Considering actual use as the dependent variable, Bergeron (1995) reports a positive influence of experience.

As mentioned before, there are only few studies in the GDSS and NSS literature which consider the impact of culture. Cultural differences in GDSS-supported group processes were identified in controlled experiments in a local setting by Watson et al. (1994). Tan et al. (1995) also outlined a research project, in which they want to study GDSS effects across different cultures. To our knowledge, they have not published results of their experiments so far.

Kersten et al. (1999) found a significant impact of the user's country of residence on several variables related to the Inspire negotiation process. However, these three studies concentrate mainly on process issues and outcomes rather than on system use and assessment.

4 Analysis

4.1 Concepts and Variables

Results reported in this paper are based on data collected from 1102 negotiations between 2204 users from 55 countries carried out between 1996 and 2000. Inspire provides a considerable amount of information from automatically generated process logs, and from questionnaires the users fill in at the beginning and the end of the exercise. Although these questionnaires were not developed specifically to assess the users' attitudes towards technology adoption, they provide rich data related to variables in the AMIS model. In the following, we describe the measurement of constructs and variables we use in our exploratory analysis.

Users and User Characteristics

Apart from demographic variables of users, we consider *culture*, *previous negotiation experience, present Internet access* and *previous use of NSS* as relevant user characteristics. The following Table 2 lists the variables and their measurement:

Table 2 about here

The user population consisted of 51.2% males and 35.8% females. The remaining 13.0% did not disclose their gender. 66.4% of all users were students, about 18.7% identified themselves as "professionals", and 14.9% represent various small groups or did not answer this question. The average age of Inspire users was 28.2 years.

Previous negotiation experience was measured on a 5 point Likert scale with 1 for "very experienced" and 5 for "no experience". Average experience of users was 3.67. Only 12.7% of users referred to themselves as "very experienced" or "experienced", 26% never negotiated before. Present Internet access was measured on a 6 point Likert scale with 1 for "several times a day" to 6 for "almost never" and averaged at 2.59, which indicates quite frequent Internet access. Only 5.4% of users answered to have "almost never" access. 85.2% of Inspire users never used a NSS before.

For this study, the users' culture is the central user characteristic. We use the *national culture* as independent variable as it represents the highest level of cultural differentiation between groups (Hofstede, 1980).

In most of the previous studies, the country in which the experiments were conducted is used as indicator of the culture of subjects (e.g. Adler, 1993b; Adler & Graham, 1989; Druckman, Benton, Ali, & Bagur, 1976; Graham & Mintu-Wimsat, 1997; Herbig & Kramer, 1991; Rubin & Sander, 1991). However, as two thirds of the users of Inspire are students and university education is becoming increasingly international, the current country of residence could be only a weak indicator of a user's culture. Therefore, the sample was restricted to users whose place of birth and residence was the same country. This country was then used as indicator of culture. Although this selection procedure does not take cultural diversity within one country into account, as is the case for example in Canada or Switzerland, we can control at least for migration to some extent (Kersten & Noronha, 1999a). Additionally, to obtain sufficient cell populations in the analyses of variance that were performed, only countries with more than 30 users were considered. Based on these two criteria, data from eleven countries was used: Austria, Canada, Switzerland, Germany, Ecuador, Finland, Hong Kong (China), India, Russia, Taiwan and USA. Together they comprise 1483 users (67.3%) of the total number of negotiators. An overview of frequencies of users' countries and gender is given in Table 3.

Table 3 about here

Dependent Variables

Table 4 shows how the dependent concepts *actual use*, *ease of use*, and *usefulness* were measured.

Table 4 about here

A confirmatory factor analysis confirmed that both the actual use and ease of use are homogenous concepts. The value of the Cronbach alpha coefficient for *ease of use* (0.67) exceeds the suggested threshold for exploratory research of 0.6 (Hair, Anderson, Tatham, & Black, 1998 p. 118). The alpha coefficient for *Actual use* even exceeds the limit of 0.7, which is the recommended threshold for non-exploratory studies. We thus can use these constructs for our further analysis. For both concepts, we used additive scales over items as factor values for further analysis.

The alpha coefficient for *usefulness* clearly indicates that the two items MSGHELPF ("Helpfulness of Messages") and UTILITYV ("Usefulness of Utility Evaluation") do not measure a single underlying construct. This is also confirmed by the low correlation between these two variables (r = 0.27). It seems that the users perceived the communication platform of the system and the analytical, decision-oriented features of the system as rather distinct components, each having a usefulness of its own. Based on this result, we considered the two items separately.

4.2 Results

Our research framework led us to expect that users' characteristics influence their perceptions of usefulness and ease of use, as well as their actual use of the system. To test this hypothesis, we estimated individual multivariate general linear models (GLM) for all dependent variables using gender, culture, and previous use of NSS as factors and age, present Internet access and previous negotiation experience as variates. To account for possible correlations between dependent variables, we also estimated a simultaneous model. Since results of the simultaneous model closely corresponded to the independent models, we only present results of the independent models here. Table 5 shows results for all four dependent variables (values significant at the 1% level are printed in **boldface** and *italics*, those significant at the 5 % level in **boldface**):

Table 5 about here

Apart from country of residence, only two user characteristics had a significant impact on the perceived usefulness, ease of use or actual use. Previous negotiation experience had a positive influence on perceived ease of use with a parameter estimate of β = 0.2583 (p = .03). Present Internet access significantly influenced actual use, i.e. the more frequent the user accesses the Internet access, the more often he or she actually sends messages or offers (β = 0.3267, p = .001).

The only consistent influence on all four dependent variables was the user's country of residence. Figure 4 gives an overview of the means of all four dependent variables across countries.

Figure 4 about here

In our GLM models we used the *USA* as the *reference category* to estimate parameters for each country. We also tested the hypothesis that parameter values of individual countries are identical to the average parameter for all countries (see Table 6). In the following, we discuss significant parameter estimates in detail.

Table 6 about here

Actual Use

We measured the actual use of communication platform by adding up the number of offers, the number of offers with messages and the number of messages without offers to form one construct variable. The highest usage of the communication tools was by users from Ecuador (ϐ = 3.192, p < .001), followed by Hong Kong (ϐ = 0.828 , p = .099), Finland (ϐ =0.977, p < .009) and Taiwan (ϐ = 0.577, p = .299). Users from India (ϐ = -1.587, p < .001), Russia (ϐ = -1.143, p = .013), Germany (ϐ = -1.204, p = .014) and USA (ϐ = -1.044, p = .002) sent significantly fewer offers and/or messages to their negotiation partners than average users. Although the parameter estimate of Taiwan is not significant when compared to the sample mean, Taiwanese negotiators sent significantly more offers and messages compared to negotiators from the USA (ϐ = 1.621, p = .014).

Perceived ease of use

Perceived ease of use was also measured with an additive scale by adding all item values of the factor into one variable. Significant better evaluations of ease of use come from Indians (ϐ = 0.473, p < .001) and Russians (ϐ = 0.149, p = .024). Significant lower evaluations were given by users from Germany (ϐ = -1.273, p = .008) and from Taiwan (ϐ = -1.123, p = .026). People from Hong Kong evaluated ease of use similarly to users from Taiwan but the parameter estimate in the model is not significant (ϐ = -0.409, p = 0.479).

Perceived usefulness of communication platform

The usefulness of the communication platform, i.e. the possibility to send messages with or without offers was perceived significantly less useful by Finnish users (ϐ = -0.557, p < .001). Austrians and

users of Ecuador and Taiwan valued the additional communication possibilities also relatively low, although the differences to the mean or to users of the USA are not significant for both countries. Users from Switzerland, Germany, Canada and USA gave the highest evaluations.

Perceived Usefulness of analytical features

We observe a different pattern for the usefulness of the analytical tool of Inspire. Users from Ecuador perceived this feature less useful than other users (β = -0.507 , $p < .001$). Similarly, users from Taiwan (β = -0.332, p = .120), Hong Kong (β = -0.217, p = .376) and from Russia (β = -0.177, p = .412) evaluated the usefulness of the analytical feature lower than the average user, although the difference to the mean is not significant. But when we compare users from Taiwan to users from the USA, the difference becomes significant (p = .011). Users from USA (β = 0.325, p = .024), Canada (β = 0.219, p = .036) and India (β = 0.328, p = .023) evaluate the usefulness of analytical features significantly better than the average users. Swiss users evaluated usefulness also relatively high, although the difference is statistically not significant.

5 Discussion and conclusions

Given these results, we need to consider culture as an important factor for design and implementation of NSS tools in international negotiations. If we compare the use and evaluation of the features offered by Inspire according to cultural groups, we find interesting and plausible patterns. We can, for instance, distinguish Ecuador, Taiwan and Hong Kong as high context cultures from Canada, USA and Northern Europe as rather low context cultures. As mentioned before, we would expect, in accordance with Hall (1976), a difference in the need for explicit coding and transmission of information for these countries. One would suppose that people from high context cultures need less explicit coding of information compared to low context cultures. When we look at the average actual use of the communication platform across these countries, we find almost the opposite pattern. Ecuadorians and people from Taiwan and Hong Kong sent significantly more offers and additional messages than Canadians, Americans or Europeans (except Finland).

This apparent contradiction can be explained by taking into account the specific situation of Web-based negotiations. In negotiations through Inspire, users were matched anonymously and exchanged only written information in form of offers or plain text messages. We believe that the extensive use of the communication platform of users from high context cultures could be explained in their need to

construct a social context in which negotiations are embedded and are used as a substitute to the rich cues of communication, body language etc. that would be present in face-to-face negotiations.

Theoretically, it is not necessary to deliver additional information about offers to negotiate or achieve a settlement. Furthermore, the mere exchange of standardized offers can be seen as facilitating the focus on issues or task and not on personalities or social matters (Kersten and Noronha, 1999). We assume that this task-oriented way of negotiation better fits to European and North American countries, while high-context cultures take a different approach.

The distinction between high- and low-context cultures is also apparent in the different perception of the analytical support provided by Inspire. To specify preferences about four different issues and to combine them into one utility function may probably be a very "western" and task oriented way to think about preferred negotiation outcomes. Social or personal factors in negotiations do not enter these calculations. Hence, in our study the most positive feedback on the analytical support feature was reported from users of Switzerland, followed by India, USA and Canada. The lowest values of usefulness in our sample are given by users from Ecuador, Taiwan and Hong Kong.

These explanations for the different patterns in perceived usefulness and actual use of system features are still tentative and need to be verified in further research. Although they seem plausible, some puzzles remain. For instance, users from Finland evaluated the system in some aspects rather different from other European countries, which can not be explained by referring to the distinction of low- and high context culture. On the other hand, users from India, who have a very different cultural background compared to users from western countries, evaluated the system similar to Americans and Canadians.

However, we can draw some conclusions from the findings of this study. Culture is an important new factor arising in the context of information systems used for cross-cultural applications like international negotiations. It has has already been shown that culture has a strong influence on the Web-based negotiation process (Kersten et al., 1999). The present study goes one step further and indicates that culture also has to be taken into account in determining a user's perception of and attitudes towards an information system. Cultural aspects thus need to be considered when developing individual or group decision support systems that are to be used by an international audience.

The results of our study also have consequences on the methods by which internet-based decision and negotiation support systems can be evaluated. Localized assessment based on a small uniform user group does not provide a valid evaluation of systems in this context. Features that are particularly im-

portant or useful to one group of users might have much less value or even be obstacles for users from another cultural background. Globalization of software development and use thus also requires globalization of software evaluation.

This study is based on a significantly larger sample than other similar studies. However, it has some drawbacks, which will need to be addressed in future work. Inspire is an open system, so we cannot control the user population which forms the basis of our analysis. This might introduce unknown biases through user characteristics, which are neither controlled nor measured in our analysis. Controlled, inasmuch as possible given the Web environment, experimental design to analyze cultural impact on perception and use of NSS is therefore necessary.

Our study also shows that the AMIS model is a useful starting point for evaluating decision and negotiation support systems in a web-based context. But it also has shown that the AMIS model is just a starting point, and that further work on its theoretical foundations, measurement of constructs, and empirical verification are necessary.

References

Adler, N. J. (1993a). Do Cultures Vary? In T. D. Weinshall (Ed.), *Societal Culture and Management* (pp. 23-46). Berlin: Walter de Gruyter & Co.

Adler, N. J. (1993b). Negotiating with Foreigners. In T. D. Weinshall (Ed.), *Societal Culture and Management* (pp. 501-535). Berlin: Walter de Gruyter & Co.

Adler, N. J., & Graham, J. L. (1989). Cross-Cultural Interaction: The International Comparison Fallacy? *Journal of International Business Studies*, 515-537.

Agarwal, R., & Prasad, J. (1998). The Antecedents and Consequents of User Perceptions in Information Technology Adoption. *Decision Support Systems, 22*(1), 15-29.

Agarwal, R., & Prasad, J. (1999). Are Individual Differences Germane to the Acceptance of New Information Technologies? *Decision Sciences, 30*(2), 361-391.

Al-Khaldi, M. A. (1999). The Influence of Attitudes on Personal Computer Utilization among Knowledge Workers, The Case of Saudi Arabia. *Information and Management, 36*(4), 185-204.

Angur, M. G., Lotfi, V., & Sarkis, J. (1996). A Hybrid Conjoint Measurement and Bi-criteria Model for a Two Group Negotiation Problem. *Socio-Economic Planning Sciences, 30*(3), 195 - 206.

Benbasat, I., & Nault, B. R. (1990). An Evaluation of Empirical Research in Managerial Support Systems. *Decision Support Systems, 6*(3), 203-226.

Bergeron, F., Raymond, L., Rivard, S., & Gara, M.-F. (1995). Determinants of EIS use: Testing a behavioral model. *Decision Support Systems, 14*(2), 131-146.

Brett, J. M. (1998b). Inter- and Intracultural Negotiation: U.S. and Japanese Negotiators. *Academy of Management Journal, 41*(5), 495-510.

Brett, J. M., Adair, W., Lempereur, A., Okumura, T., Shikkhirev, P., Tinsley, C., & Lytle, A. (1998a). Culture and Joint Gains in Negotiation. *Negoitiation Journal on the Process of Dispute Settlement, 14*(1), 31-86.

Chan, C. W. (1998). Transfer pricing Negotiation outcomes and the Impact of Negotiator Mixed-motives and Culture: Empirical Evidence from the U.S. and Australia. *Management Accounting Research, 9*(2), 139-161.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly, 13*, 318-340.

Dishaw, M. T., & Strong, D. M. (1991). Extending the Technology Acceptance Model with Task-technology Fit Constructs. *Information and Management, 36*(1), 9-21.

Doll, W. J., Hendrickson, A., & Deng, X. (1998). Using Davis's Perceived Usefulness and Ease-of-use Instruments for Decision Making: A Confirmatory and Multigroup Invariance Analysis. *Decision Sciences, 29*(4), 839-869.

Druckman, D., Benton, A. A., Ali, F. & Bagur, J. S. (1976). Cultural Differences in Bargaining Behavior: India, Argentina, and the US. *Journal of Conflict Resolution, 20*(3), 413-452.

Graham, J. L., & Mintu-Wimsat, A. (1997). Culture's Influence on Business Negotiations in Four Countries. *Group Decision and Negotiation, 6*, 483-502.

Green, P. E., & Wind, Y. (1973). *Multiattribute Decisions in Marketing: A Measurement Approach*. Hinsdale, IL: The Dryden Press.

Guimaraes, T., Igbaria, M., & Lu, M.-T. (1992). The Determinants of DSS Success: An Integrated Model. *Decision Sciences, 23*, 409-430.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate Data Analysis*. (5 ed.). Upper Saddle River, NJ: Prentice Hall.

Hall, E. (1976). *Beyond Culture*. New York: Doubleday.

Herbig, P. A., & Kramer, H. E. (1991). Cross-Cultural Negotiations: Success Through Understanding. *Management Decision, 29*(8), 19 - 31.

Hofstede, G. (1980). *Culture's consequences, international differences in work-related values.* (1 ed.). (Vol. 5). Newbury Park London: SAGE.

Jackson, C. M., Chow, S., & Leitch, R. A. (1997). Toward an Understanding of the Behavioral Intention to Use an Information System. *Decision Sciences, 28*(2), 357-389.

Kersten, G. E. (1985). NEGO - Group Decision Support System. *Information and Management, 8*(5), 237-246.

Kersten, G. E., Köszegi, S. T., & Vetschera, R. (1999). *The Effects of Culture in Anonymous Negotiations. A Four Countries Experiment*. Proceedings, Academy of Business Administration 1999, Global Trencs Conference, St. Thomas, U.S. Virgin Ilands.

Kersten, G. E., & Noronha, S. (1999a). Negotiations via the World Wide Web: A Cross-cultural Study of Decision Making. *Group Decision and Negotiations*((to appear)).

Kersten, G. E., & Noronha, S. J. (1999b). WWW-based Negotiation Support: Design, Implementation, and Use. *Decision Support Systems, 25*(2), 135-154.

Kharbanda, O. P., & Stallworthy, E. A. (1991). Negotiation Across Cultures. *Journal of Managerial Psychology, 6*(4), 14 - 21, 49 - 52.

Mathieson, K. A. (1991). Predicting User Intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behavior. *Information Systems Research, 2*(3), 173-191.

Moore, G. C., & Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research, 2*(3), 192-222.

Rangaswamy, A., & Shell, G. R. (1997). Using Computers to Realize Joint Gains in Negotiations: Toward an "Electronic Bargaining Table". *Management Science, 43*(8), 1147-1163.

Rubin, J. Z., & Sander, F. E. (1991). Culture, Negotiation, and the Eye of the Beholder. *Negotiation Journal*(July), 249-254.

Straub, D., Keil, M., & Brenner, W. (1997). Testing the Technology Acceptance Model across Cultures: A Three Country Study. *Information and Management, 33*(1), 1-11.

Szajna, B. (1996). Empirical Evaluation of the Revised Technology Acceptance Model. *Management Science, 42*(1), 85-92.

Tan, B. C. Y., Watson, R. T., & Wei, K.-K. (1995). National Culture and Group Support Systems: Filtering Communication to Dampen Power Differentials. *European Journal of Information Systems, 4*, 82-92.

Taylor, S., & Todd, P. A. (1995). Understanding Information Technology Usage: A Test of Competing Models. *Information Systems Research, 6*(2), 144-176.

Udo, G. J., & Guimaraes, T. (1994). Empirically Assessing Factors Related to DSS Benefits. *European Journal of Information Systems, 3*(3), 218-227.

Vetschera, R., Kersten, G., & Köszegi, S. T. (2001). Determinants of User Attitudes Towards Web-based Negotiation Support Systems - An Exploratory Analysis. *WP 2001-01; submitted*.

Watson, R. T., Ho, T. H., & Raman, K. S. (1994). Culture - A Fourth Dimension of Group Support Systems. *Communications of the ACM, 37*(10), 45-55.

Yaverbaum, G. J. (1989). Critical Factors in the User Environment: An Experimental Study of Users, Organizations and Tasks. *MIS Quarterly, 13*, 74-88.

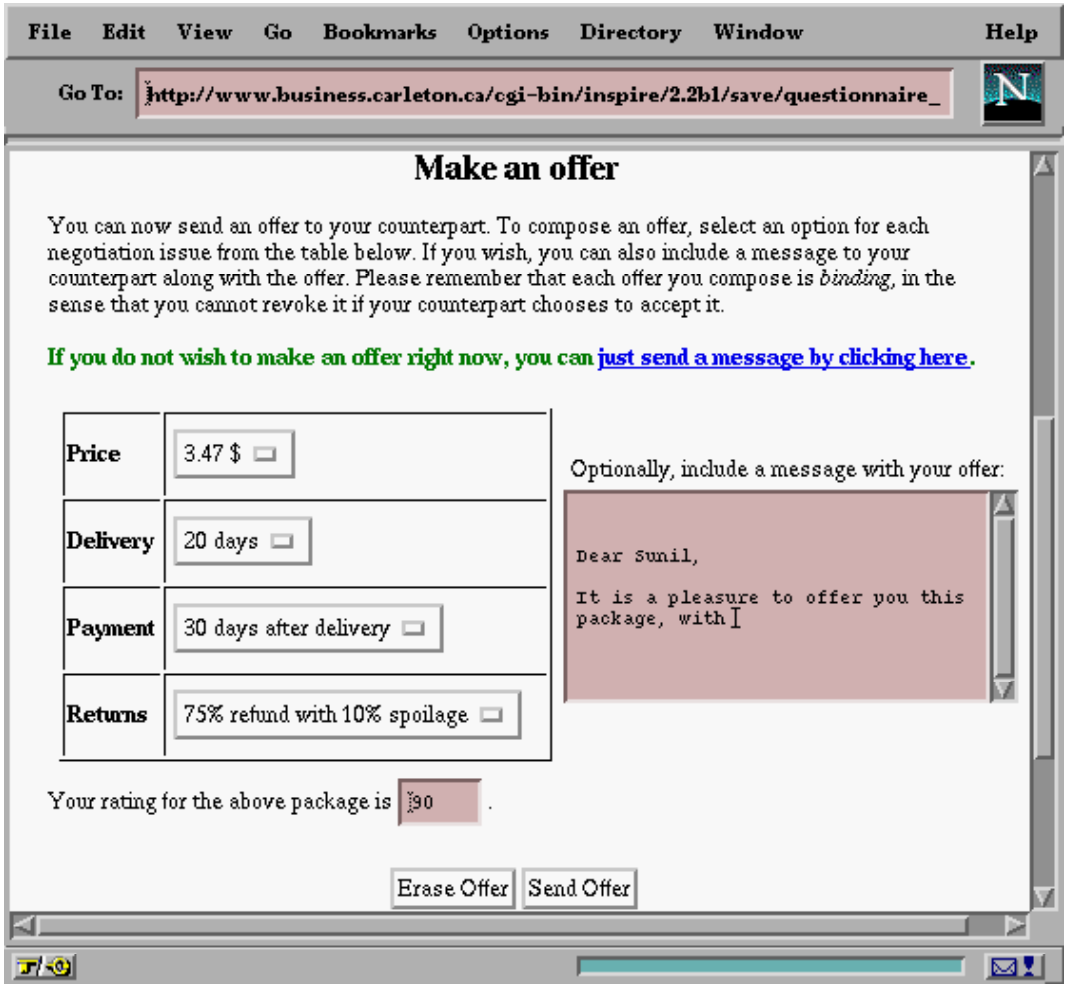

Figure 1: Communication Platform

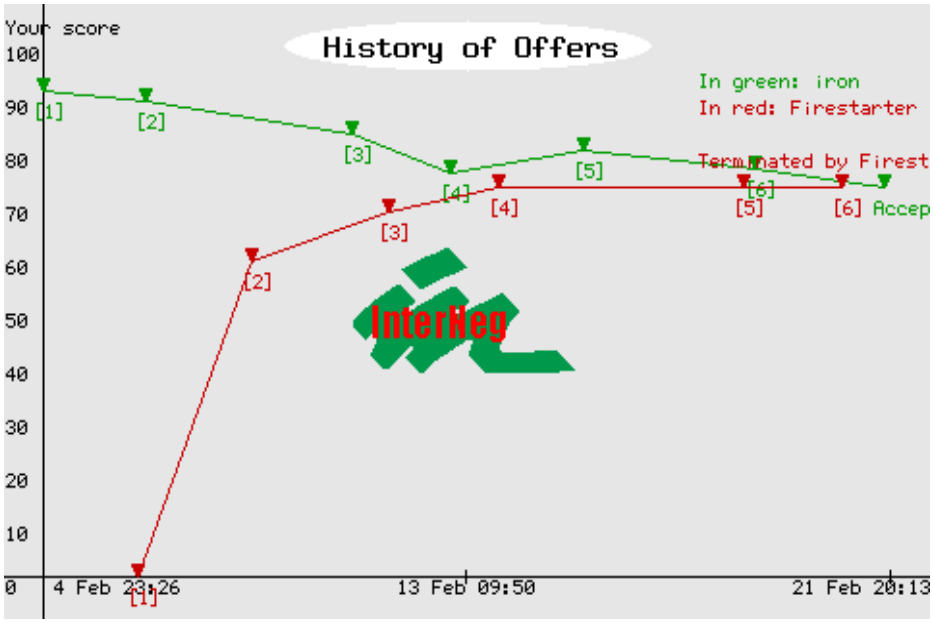

Figure 2: Negotiation History Graph

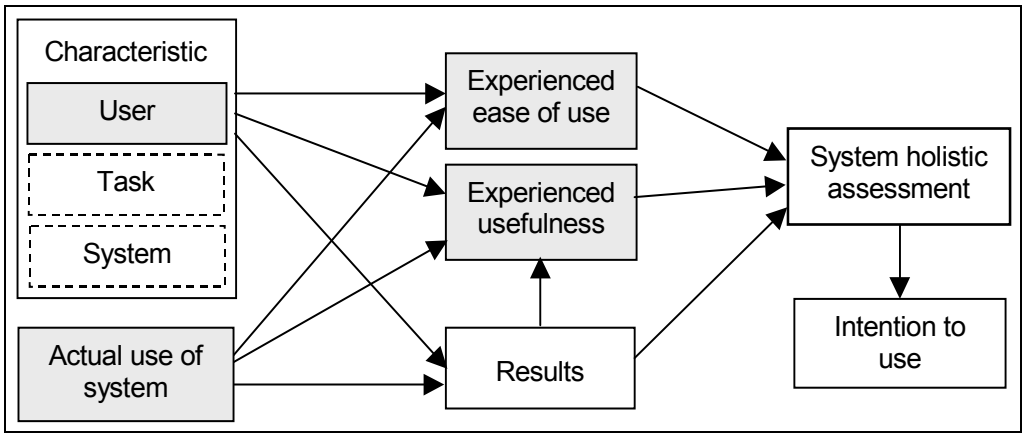

Figure 3: Assessment Model of Internet-based NSS.

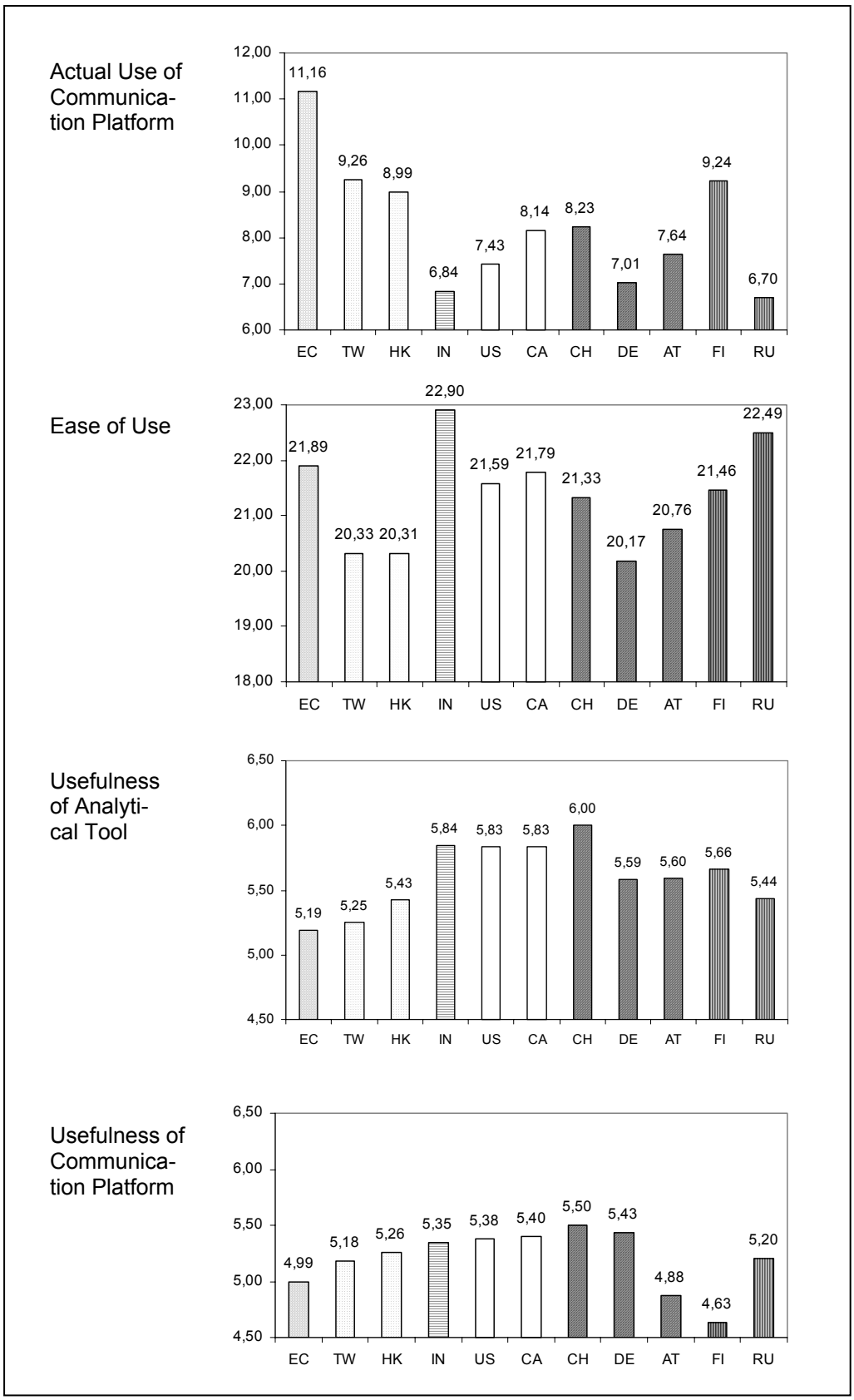

Table 1: User Willingness to Use Internet-based Negotiation Support.

Variable	Description	Type	Value Range
YOFB	Year of birth	real	numerical
Gender	User's gender	categorical	female, male, missing
OCCUPATN	User's occupation	categorical	student, pofessional, other
Creside	User's country of residence	categorical	AT, CA, CH, DE, EC, FI, HK, IN, RU, TW, US
NSSBEFOR	Previous experience with NSS	categorical	0 = no, 1 = yes
NEXP	Previous negotiation experience	Likert scale	1 = several times a day, 6 = almost never
IACC	Present internet access	Likert scale	1 = very experienced, 5 = no experience

Table 2: Variables of User Characteristcs and their Measurement

		GENDER			
		Female	Male	No Answer	Total
Country of Residence	AT Austria	27	39		66
	CA Canada	118	144	76	338
	CH Switzerland	15	23	1	39
	DE Germany	36	35	2	73
	EC Ecuador	85	69	1	155
	FI Finland	47	75	21	143
	HK Hong Kong	29	9	42	80
	IN India	21	160	28	209
	RU Russia	49	40	2	91
	TW Taiwan	24	33	1	58
	US USA	80	132	19	231
Total		531	759	193	1483
		35,8%	51,2%	13,0%	100,0%

Table 3: Country of Residence and Gender

Concept	Variable	Description	Type	Value Range
Actual use	OFR	Number of offers sent	real	numerical
Cronb. Alpha = 0.7213	OFRWMSG	Number of offers sent by user that included written messages.	real	numerical
	MSG	Number of written message sent by user besides offers	real	numerical
Ease of Use	CASEUND	Ease to understand case	Likert scale	1 = extr. difficult 5 = extr. easy
Cronb. Alpha = 0.6734	WTGISSUE	Ease of weighting issues	Likert scale	1 = extr. difficult 5 = extr. easy
	WTGOPTIO	Ease of weighting options	Likert scale	1 = extr. difficult 5 = extr. easy
	INEASY	Ease of using the system	Likert scale	1 = extr. difficult 7 = extr. clear
	INSTRUCT	Clarity of the system instructions	Likert scale	1 = not clear at all 7 = perfectly clear
Usefulness	MSGHELPF	Messages helpful	Likert scale	1 = detrimental 7 = extr. helpful
Cronb. Alpha = 0.4293; r = 0.2733	UTILITYV	Usefulness of the utility rating displayed with offers	Likert scale	1 = detrimental 7 = extr. useful

Table 4: Dependent Variables and their Measurement

Dependent Variable	Source	Type III SS	df	Mean Square	F	Pr > F
Actual use	Gender	21,636	2	10,818	,564	,569
	Age	9,519	1	9,519	,496	,481
	Country	***2538,038***	***10***	***253,804***	***13,229***	***,000***
	Used NSS before	41,107	1	41,107	2,143	,143
	Internet access	***220,546***	***1***	***220,546***	***11,495***	***,001***
	Neg. experience	3,281	1	3,281	,171	,679
Ease of use	Gender	39,077	2	19,538	1,888	,152
	Age	29,665	1	29,665	2,867	,091
	Country	***405,995***	***10***	***40,599***	***3,924***	***,000***
	Used NSS before	6,375	1	6,375	,616	,433
	Internet access	1,007	1	1,007	,097	,755
	Neg. experience	**51,933**	**1**	**51,933**	**5,019**	**,025**
Usefulness of commu-nication platform	Gender	3,746	2	1,873	1,024	,360
	Age	4,388	1	4,388	2,398	,122
	Country	**37,205**	**10**	**3,720**	**2,033**	**,028**
	Used NSS before	,400	1	,400	,219	,640
	Internet access	,280	1	,280	,153	,696
	Neg. experience	,734	1	,734	,401	,527
Usefulness of analyti-cal tool	Gender	3,286	2	1,643	,876	,417
	Age	2,426	1	2,426	1,294	,256
	Country	***49,086***	***10***	***4,909***	***2,618***	***,004***
	Used NSS before	,654	1	,654	,349	,555
	Internet access	,205	1	,205	,109	,741
	Neg. experience	,313	1	,313	,167	,683

Table 5: GLM-Models User Characteristcs

Dependent Variable	Country	Estimates (against Sample Mean)		USA as Reference Category	
		Parameter	Pr>|t|	Parameter	Pr>|t|
Actual Use	Austria	-0,607	0,234	0,437	0,492
	Canada	-0,179	0,495	**0,865**	**0,031**
	Switzerland	0,192	0,771	1,237	0,122
	Germany	***-1,204***	***0,014***	-0,160	0,795
	Ecuador	***3,192***	***< 0,001***	***4,237***	***< 0,001***
	Finland	***0,977***	***0,009***	***2,021***	***< 0,001***
	Hong Kong	0,828	0,099	***1,872***	***0,003***
	India	***-1,587***	***< 0,001***	-0,542	0,211
	Russia	***-1,143***	***0,013***	-0,099	0,872
	Taiwan	0,577	0,299	***1,621***	***0,014***
	USA	***-1,044***	***0,002***		
Ease of Use	Austria	-0,694	0,144	-0,979	0,107
	Canada	0,459	0,063	0,174	0,660
	Switzerland	-0,118	0,867	-0,403	0,637
	Germany	***-1,273***	***0,008***	***-1,558***	***0,010***
	Ecuador	0,330	0,337	0,045	0,927
	Finland	-0,080	0,828	-0,065	0,469
	Hong Kong	-0,409	0,479	-0,694	0,326
	India	***0,473***	***< 0,001***	***1,188***	***0,009***
	Russia	**0,149**	**0,024**	0,565	0,188
	Taiwan	**-1,123**	**0,026**	**-1,408**	**0,020**
	USA	0,285	0,402		
Usefulness of Communication Platform	Austria	-0,260	0,198	-0,358	0,171
	Canada	0,164	0,122	0,066	0,702
	Switzerland	0,328	0,274	0,230	0,526
	Germany	0,270	0,201	0,172	0,523
	Ecuador	-0,240	0,099	-0,339	0,111
	Finland	***-0,557***	***< 0,001***	***-0,656***	***0,003***
	Hong Kong	0,008	0,974	-0,090	0,765
	India	0,149	0,301	0,052	0,792
	Russia	0,095	0,677	-0,003	0,992
	Taiwan	-0,054	0,802	-0,152	0,559
	USA	0,098	0,510		
Usefulness of Analytical Tool	Austria	0,018	0,929	-0,307	0,234
	Canada	**0,219**	**0,036**	-0,106	0,527
	Switzerland	0,320	0,290	-0,006	0,988
	Germany	0,004	0,985	-0,322	0,214
	Ecuador	***-0,507***	***< 0,001***	***-0,832***	***< 0,001***
	Finland	0,018	0,906	-0,307	0,151
	Hong Kong	-0,217	0,376	-0,542	0,071
	India	**0,328**	**0,023**	0,002	0,990
	Russia	-0,177	0,412	-0,502	0,072
	Taiwan	-0,332	0,120	**-0,657**	**0,011**
	USA	**0,325**	**0,024**		

Table 6: Parameter Estimates for Culture